Air Accident Investigation Unit Ireland

SYNOPTIC REPORT

ACCIDENT
Tecnam P2002-JF, EI-WAT
Cork Airport
23 June 2018

An Roinn Iompair
Turasóireachta agus Spóirt
Department of Transport,
Tourism and Sport

Foreword

This safety investigation is exclusively of a technical nature and the Final Report reflects the determination of the AAIU regarding the circumstances of this occurrence and its probable causes.

In accordance with the provisions of Annex 13[1] to the Convention on International Civil Aviation, Regulation (EU) No 996/2010[2] and Statutory Instrument No. 460 of 2009[3], safety investigations are in no case concerned with apportioning blame or liability. They are independent of, separate from and without prejudice to any judicial or administrative proceedings to apportion blame or liability. The sole objective of this safety investigation and Final Report is the prevention of accidents and incidents.

Accordingly, it is inappropriate that AAIU Reports should be used to assign fault or blame or determine liability, since neither the safety investigation nor the reporting process has been undertaken for that purpose.

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[1] **Annex 13**: International Civil Aviation Organization (ICAO), Annex 13, Aircraft Accident and Incident Investigation.
[2] **Regulation (EU) No 996/2010** of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation.
[3] **Statutory Instrument (SI) No. 460 of 2009**: Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulations 2009.

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In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No 996/2010 and the provisions of SI No. 460 of 2009, the Chief Inspector of Air Accidents on 24 June 2018, appointed Mr Howard Hughes as the Investigator-in-Charge to carry out an Investigation into this Accident and prepare a Report.

Aircraft Type and Registration:	Costruzioni Aeronautiche Tecnam S.r.l., P2002-JF, EI-WAT
No. and Type of Engines:	1 X Rotax 912 S2
Aircraft Serial Number:	086
Year of Manufacture:	2008
Date and Time (UTC)[4]:	23 June 2018 @ 15.27 hrs
Location:	Cork Airport (EICK)
Type of Operation:	General Aviation
Persons on Board:	Crew - 1 Passengers - Nil
Injuries:	Crew - Nil
Nature of Damage:	Aircraft damaged beyond economic repair
Commander's Licence:	Student Pilot flying under Flight Instructor authorisation
Commander's Age:	31 years
Commander's Flying Experience:	71 hours, of which 59 were on type
Notification Source:	Duty Manager EICK
Information Source:	AAIU Field Investigation AAIU Report Form submitted by the Pilot

[4] **UTC**: Co-ordinated Universal Time. All timings in this report are quoted in UTC; Local time was UTC +1 hour.

SYNOPSIS

The aircraft, with a solo Student Pilot on board, was carrying out a cross-country navigation exercise from Waterford Airport (EIWF), via Shannon Airport (EINN) and Cork Airport (EICK), with the intention of returning to EIWF. During the landing at EICK, control of the aircraft was lost, and it impacted at the threshold of runway (RWY) 16. The aircraft came to rest on the runway threshold, upright, with the left main-gear and nose-gear detached. The Student Pilot exited the aircraft uninjured. There was no fire.

NOTIFICATION

The AAIU Inspector-on-Call was notified by the Cork Airport Duty Manager. Once it was determined that the Pilot was uninjured, and that detailed photography of the aircraft in situ could be taken by personnel at the scene, the AAIU permitted the removal of the aircraft from the runway to facilitate the resumption of flight operations on RWY 16. A team of investigators from the AAIU deployed the following day to commence a field investigation.

1. FACTUAL INFORMATION

1.1 History of Flight

The Student Pilot was carrying out a solo navigation exercise routing from EIWF via EINN and EICK and returning to EIWF. The aircraft took off from EIWF at 13.31 hrs. The flight proceeded normally to EINN, where the Student Pilot performed a touch-and-go landing on RWY 24 at 14.45 hrs. Following the touch-and-go, the Student Pilot set course for EICK at time 14.50 hrs. At 15.05 hrs, the aircraft was transferred to EICK Approach Control at which point the Controller cleared the Student Pilot to route to the town of Watergrasshill. The Student Pilot informed the Controller that he was not familiar with the area, so the Approach Controller cleared the aircraft direct to EICK.

At 15.18 hrs, the aircraft was transferred to the tower frequency at EICK. The Air Movements Controller (AMC) situated in the tower, cleared the Student Pilot to continue the approach and to call at 3 NM (nautical miles) from RWY 16 at EICK.

At 15.23 hrs, the Student Pilot reported that he was at approximately 3 NM from touchdown. The AMC instructed the Student Pilot to continue the approach, and informed the Student Pilot that the surface wind was 210 degrees at 8 knots (kts).

At 15.25 hrs, the aircraft was cleared for a touch-and-go on RWY 16, and the surface wind was reported as 210 degrees at 6 kts.

The aircraft came over the threshold of RWY 16 at 15.27 hrs, in level flight. Shortly after crossing the threshold, the nose-up pitch attitude of the aircraft increased and the aircraft rolled rapidly to the right. The aircraft impacted the runway, and came to rest on the runway, 46.8 m from the threshold and 16.5 m to the right of the centreline, (**Photo No. 1)**.

Photo No. 1: Aircraft in its final position, post-accident.

The Student Pilot, who was uninjured, switched off the aircraft electrics and exited the aircraft, making his way to a grass area east of the runway.

1.2 Interviews

1.2.1 Student Pilot

The Investigation interviewed the Student Pilot on the day following the accident. He stated that he had little recollection of the event, but was of the belief that the approach was '*normal*' and that the aircraft had '*touched down normally*', following which the nose gear appeared to collapse and the aircraft performed a ground loop in a clockwise direction. He stated that he flew the approach on a 3° glidepath with "*2 reds and 2 whites visible on the PAPIs*"[5]. He informed the Investigation that the approach was conducted at 60 kts, with landing flap being selected at 400 ft above the runway, and then flown at 55 kts, as he had been instructed.

In a follow-up interview, the Student Pilot recalled the same sequence of events, though, in hindsight, he thought that the approach may have begun slightly high, as he '*saw 4 whites*' (a reference to the lights visible on the PAPI), during the initial portion of the final descent towards the runway. The Student Pilot was asked about the number of times he had landed at EICK. His recollection was that he had landed there three times previously. He stated that from memory, these landings had been to RWYs 25 and 34 at EICK.

[5] **PAPI**: Precision Approach Path Indicator. A type of visual glidepath indicating system.

1.2.2 Tower Controller

The Investigation interviewed the AMC who was in the control tower at the time of the accident. The AMC told the Investigation that he had paid particular attention to the subject aircraft when it was on short finals, as '*It didn't look like he was fully steady, and I was really monitoring him when I did notice that. It just didn't look normal'.* The AMC remarked that the aircraft appeared to be flying as if it was experiencing a high wind, even though the winds were very light. The AMC also noted that just before crossing the runway threshold '*he did look a bit lower than most of them would.* […] *So he came in over the threshold and the aircraft lost all control. As if it lost lift. And the right side dropped. There was a wing strike and it just crashed after that. As soon as I saw the right wing strike, I was straight up and hit the* [crash] *buttons'.*

1.3 Injuries to Persons

No injuries were reported to the Investigation.

1.4 Damage to Aircraft

1.4.1 General

The right wing sustained upward chord-wise folding and creasing, approximately 1.5 m inboard of the wingtip. The right wingtip sustained abrasive damage to the navigation light, wingtip leading edge fairing and the right aileron balance horn. There was also chord-wise abrasion to the outer 1.5 m of the underside leading edge skin panels of the right wing.

The left wing also sustained upward chord-wise folding and creasing, approximately 1.5 m inboard of the wingtip. There was span-wise scoring to the underside leading edge surface of the left wing. The left wing flap showed impact damage, span-wise folding, and creasing of the skin, due to contact with the runway surface. The aircraft flaps on both wings were found in the fully extended position.

The propeller spinner had damage to the tip consistent with ground contact. There was also damage to the aft portion of the spinner where it attached to the spinner back plate on the propeller mounting flange. This damage was consistent with it making contact with the forward engine cowling whilst under rotation. The forward engine cowling surrounding the propeller drive shaft, showed corresponding damage due to contact with the spinner and propeller mounting plate whilst these were under rotation.

Only 0.3 m of the wooden propeller blades remained attached to the propeller hub. Propeller blade strike marks were found on the runway, consistent with the propeller having been under power during impact with the runway surface. The left main landing gear separated from its mounting to the underside of the fuselage. The nose landing gear separated from just below its fuselage mounting point. The left side mounting step was bent under the fuselage. The aircraft pitot-static system was checked by the Investigation. No anomalies were found.

The Operator informed the Investigation that the level of damage was such that the aircraft was beyond economic repair.

1.4.2 Wreckage and Impact Information

The witness marks found on the runway surface showed that the first contact with the runway was made with the right wingtip, 17.6 m from the runway threshold. This is consistent with images obtained from Closed Circuit Television (CCTV) recordings obtained by the Investigation, which show the aircraft in a 50° to 55° right bank just prior to impact, (**Photo No. 2)**. The contact of the right wing with the runway caused the aircraft to rotate about its yaw axis, in a manner similar to a cartwheel motion, causing the aircraft nose to impact next.

During this second impact the aircraft righted itself and the nose gear and left main gear detached as they contacted the runway. The aircraft then slewed to the left and came to rest 33.8 m from the first point of contact, and 46.8 m from the runway threshold.

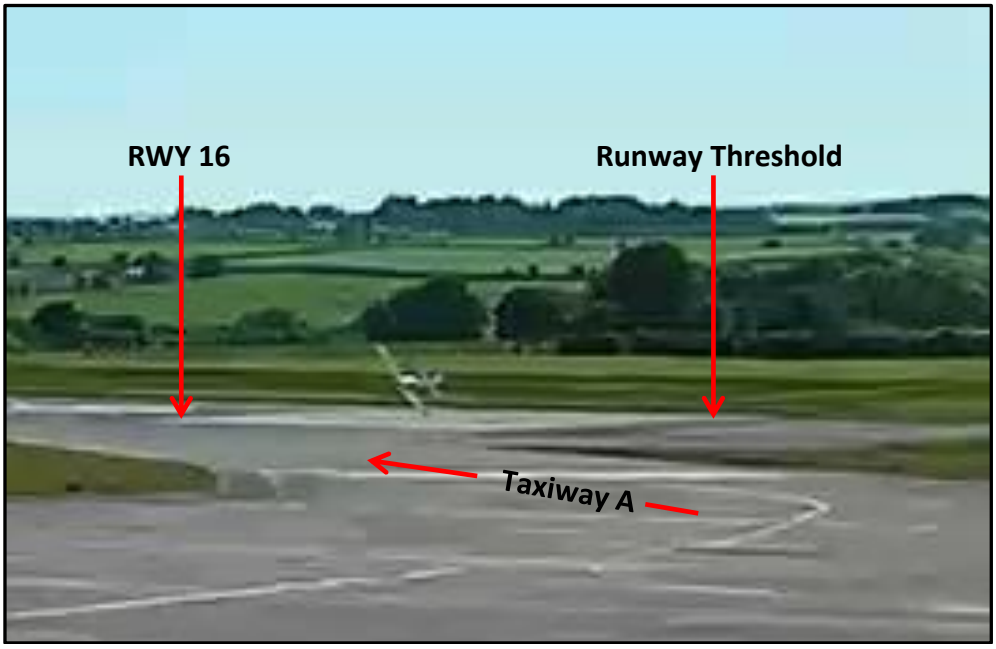

Photo No. 2: Screengrab from CCTV showing orientation of EI-WAT as the right wing contacted the runway.

With the exception of the aircraft's nose-gear, left main-gear, and some wooden propeller fragments, the aircraft remained intact during the accident sequence. The Investigation carried out a survey of the witness marks left on the runway surface following the accident. These are set out in (**Figure No. 1)**.

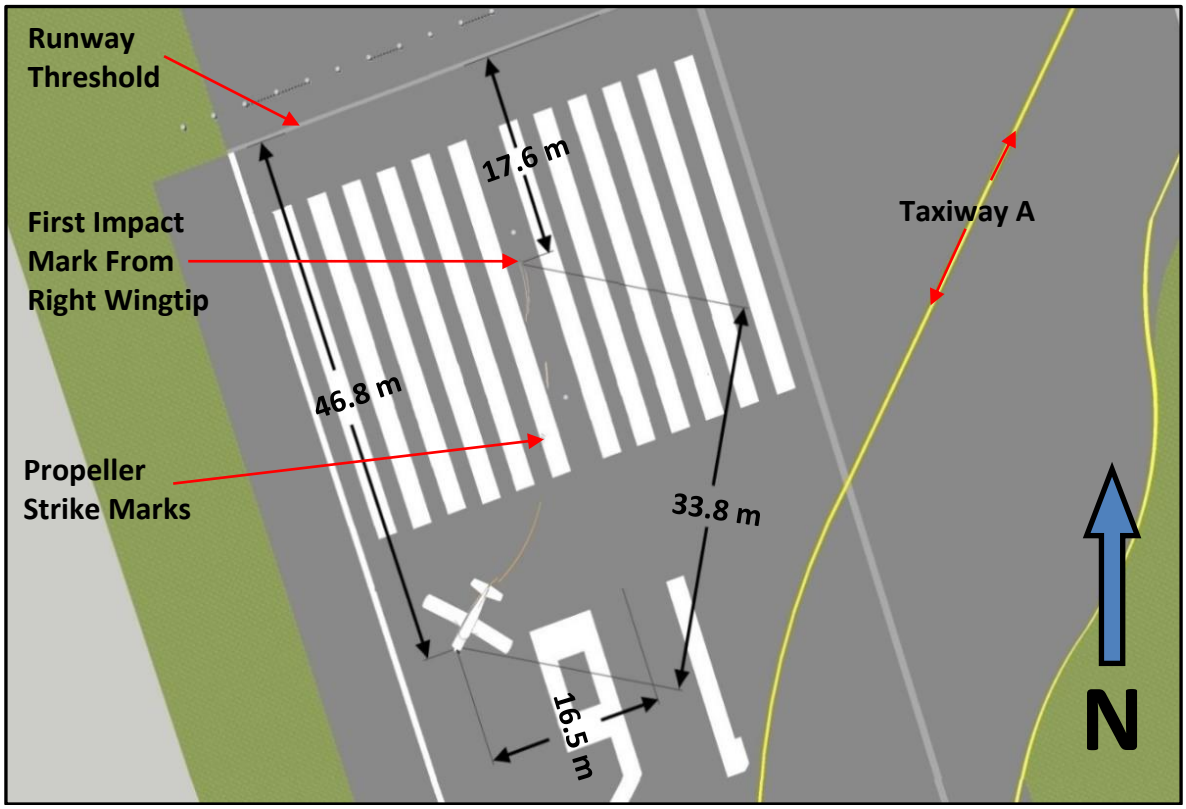

Figure No. 1: Witness marks on RWY 16

1.5 Other Damage

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There were some minor score marks on the runway surface.

1.6 Personnel Information

The Student Pilot was undergoing training for a Private Pilot Licence (Aeroplane), with a Registered Training Facility[6] (RTF). The Irish Aviation Authority (IAA) informed the Investigation that as such, the Pilot did not require a Pilot Licence, as they would be released to fly under the authorisation of an instructor of the RTF. The IAA informed the Investigation that the Pilot would require a Medical Certificate. The Student Pilot held a Class One European Union Medical Certificate, issued by the UK CAA, which was valid until 24 January 2019.

The Investigation was informed that prior to commencing training at EIWF, the Student Pilot had acquired 10 hours of flight time on a different aircraft type, at a flight training facility in the United States.

The Student Pilot's flying experience, prior to the accident flight, is set out in **Table No. 1**. A copy of the Student Pilot's logbook was viewed by the Investigation. The times set out in the table are those determined by the Investigation, using the times as entered by the Student Pilot in his logbook.

[6] A change from RTF to Designated Training Organisation (DTO) was in process, with interim arrangements in place to allow existing RTFs that had made a DTO declaration by 8 April 2018, to continue operating without interruption until such time as a transfer to DTO had taken place. The RTF had made such a declaration.

	Hours	Minutes
Total all Types:	71	35
Total on Accident Type:	59	00
P1 on Accident Type:	15	30
Last 90 Days:	14	45
Last 28 Days:	6	45
Last 24 Hours:	2	35

Table No. 1: Student Pilot's flying experience.

The Instructor that authorised the Student Pilot's solo flight was in possession of a valid pilot licence and Flight Instructor rating issued by the IAA.

1.7 Aircraft Information

1.7.1 General

The Technam P2002 is a two-seat, low-wing aircraft, constructed from aluminium and powered by a single 100 hp (75 kW) Rotax 912 S2 engine. The -JF variant has a fixed tricycle undercarriage. The cockpit has a sliding canopy, and the seating is configured side-by-side, with the pilot normally occupying the left seat. Each seat is equipped with a four-point harness.

The aircraft was factory built in 2008 and was fitted with a United Instruments 5934PM-3 altimeter. This is a 3-pointer altimeter calibrated in feet, with a barometric scale adjustment in millibars (hectopascals – hPa). The altimeter had a stated scale error tolerance of +/- 20 feet between sea level and 1,000 ft above sea level. The barometric scale adjustment was found set to a QNH of 1028 hPa, which was the EICK airfield pressure setting at the time of the accident.

The Aircraft Flight Manual[7] states that at 580 kg, with full flaps selected, the stall speed is 30 kts (indicated air speed), and the maximum speed for first stage flap extension is 74 kts.

1.7.2 Airworthiness Certification

The aircraft was operating on a valid Airworthiness Review Certificate (ARC), issued on 2 November 2017, and valid for one year.

1.8 Meteorological Information

Ireland was under the influence of high pressure, and witnesses at EICK reported that the weather at EICK was fine with good visibility, and a light south-westerly breeze.

Weather reports issued for EICK on 23 June 2018, 27 minutes prior to the accident, and three minutes after the accident were as follows:

METAR EICK 231500Z 17009KT 140V220 9999 FEW040 19/09 Q1028 NOSIG=
METAR EICK 231530Z 20008KT 160V230 9999 FEW035 19/10 Q1028 NOSIG=

[7] Third Edition, Revision 3, February 2014.

At 15.25 hrs, two minutes before the accident, the AMC reported the surface wind as 210/6 kts. This would give a headwind component of just less than 4 kts along RWY 16.

1.9 Aerodrome Information

1.9.1 Departure Airport (EIWF)

EIWF is the airport at which the Student Pilot carried out the majority of his flight training. EIWF has one asphalt take-off and landing surface, which comprises two designated runways, RWY 03 and RWY 21. The surface is 1,433 m long, and 30 m wide. The terrain on the approaches to each runway is relatively flat. Both runways are equipped with PAPIs. The PAPI for RWY 03 has the visual glidepath set to 3°. The PAPI for RWY 21 has the visual glidepath set to 3.25°.

1.9.2 Airport of First Landing (EINN)

As part of the navigation exercise the Student Pilot performed a touch-and-go landing at EINN. This was done on RWY 24 at EINN, which is 3,199 m long and 45 m wide. The runway has shoulders of 8 m either side. From approximately 3 NM on the approach to RWY 24, the terrain is generally flat.

1.9.3 Place of Accident (EICK)

The airport elevation is 502 ft AMSL. RWY 16, with an asphalt surface, is 2,133 m long and 45 m wide. There are two paved shoulders, measuring 7.5 m, one each side of the runway. Thus the paved surface of RWY 16 is 60 m wide. Associated with RWY 16 are additional paved surfaces, comprising a Jet-Blast area north of the RWY 16 threshold, and a taxiway fillet, east of the RWY 16 threshold. These areas are continuous with, and of the same material as, the runway surface, and extend 52.5 m to the left of the runway centre-line. The average distance from the beginning of the Jet-Blast area to midway along the curved edge of the taxiway fillet is approximately 94 m. RWY 16 is equipped with a PAPI, the visual glidepath of which is set to 3°.

The terrain to the north of RWY 16 slopes downhill, with a noticeably steep portion 0.5 NM from the threshold of the runway.

1.10 Recording Devices

1.10.1 General

The aircraft was not equipped with a Flight Data Recorder or a Cockpit Voice Recorder, neither of which were required for this class or category of aircraft.

Radar data was obtained for both the earlier approach at EINN and the approach to EICK.

1.10.2 EINN ATC Radar Data

The Air Traffic Control radar data for the period when the aircraft approached EINN was quarantined and retained by the Operations Manager at the Shannon Centre, Air Traffic facility, for analysis by the Investigation. The aircraft was equipped with a transponder and had been assigned a transponder code by ATC. The data obtained was from a secondary radar return and the subject aircraft's registration, altitude, and groundspeed was recorded.

The data recorded show the aircraft performing a holding pattern to the south-east of EINN, and then approaching the final inbound course on a left base. The aircraft joined the final inbound course for RWY 24 at approximately 3 NM at 800 ft. The aircraft was then recorded descending towards the runway. During the final descent, the recorded altitude suggests the aircraft was following a 3° glidepath, and the recorded aircraft groundspeed suggests the aircraft was being flown in accordance with speeds the Student Pilot had been instructed to maintain during final approach.

1.10.3 EICK ATC Radar Data

The Air Traffic Control radar data for the period when the aircraft flew from EINN to EICK was quarantined and retained by the Station Manager at Cork Air Traffic Services for analysis by the Investigation. The aircraft was equipped with a transponder and had been assigned a transponder code by ATC. The data obtained was from a secondary radar return and the subject aircraft's registration, altitude, and groundspeed were recorded.

Aircraft Height

The aircraft altitude was corrected to height above the airport elevation, and this was assessed against distance from the runway threshold. The data indicated that the aircraft approached EICK at a height of 700 ft above the airport elevation, from a distance of 4.6 NM from the runway threshold. This height was maintained until the aircraft crossed through the 3° glidepath for the runway, at approximately 2.3 NM from the threshold. At this point the aircraft was recorded as climbing to 800 ft. A descent from 800 ft then commenced, on what was an approximate 4° glidepath.

The aircraft maintained a 4° glidepath until approximately 0.8 NM from the threshold of RWY 16, when an increase in descent rate was observed from the data. The aircraft then descended through the 3° glidepath at a distance of 0.62 NM from the threshold. As it passed through the 3° glidepath, descent was arrested at 200 ft above the airport elevation. The aircraft was then recorded maintaining 200 ft until 0.4 NM from the threshold, when it was once again on a 4° glidepath.

A further descent was commenced, and at 0.33 NM from the threshold, the aircraft descended through the 3° glidepath once more.

Aircraft Groundspeed

The aircraft groundspeed obtained from the radar data, was assessed for the final 8 minutes of the approach. As the aircraft approached EICK at 700 ft above the airport elevation, it was recorded as maintaining a groundspeed of 70 kts. At the point where the aircraft started to descend from 800 ft above the airport elevation, on an approximate 4° glidepath, the aircraft groundspeed was recorded as 64 kts. The groundspeed was then recorded as continuously decreasing until just before the runway threshold, when the last radar return for the aircraft recorded a groundspeed of 38 kts.

At a point approximately 0.8 NM from the runway, and approximately 400 ft above the airport elevation, the aircraft groundspeed was recorded as 51 kts. At this point, the aircraft rate of descent increased, and the rate of reduction in aircraft groundspeed became more pronounced.

1.10.4 Closed Circuit Television (CCTV)

The airport operator had a number of CCTV cameras situated on buildings overlooking the Main Apron and Cargo Apron of the airport, some of which had recorded the aircraft as it approached the runway and came over the threshold. The Investigation secured copies of these video recordings for analysis.

One video recording showed the aircraft as it crossed over the runway threshold. The recording had elapsed time in hours, minutes, seconds and hundredths of seconds. Using known ground features, this recording was used to calculate the approximate groundspeed of the aircraft as it came in over the threshold of the runway, up to the point of impact. As the aircraft was recorded crossing a tarmacked area just before the runway threshold, termed the '*Jet-Blast Area*' on airport Runway Markings drawings, the groundspeed was calculated as approximately 38 kts. During its flight over the Jet-Blast Area the aircraft was recorded pitching up to approximately 28° nose-up. Aircraft height did not change during the pitch up manoeuvre, but groundspeed was calculated to decrease to approximately 22 kts.

The CCTV recording showed that, shortly after the pitch up manoeuvre, the aircraft rolled to the right and the right wing made contact with the runway.

Another video recording showed the aircraft on the approach path to RWY 16. When the aircraft was approximately 1 NM from the threshold it was recorded flying level. The video then showed the aircraft descending, flying level, and descending once more, before flying level over the runway threshold at approximately 15 ft above the runway surface.

1.10.5 Correction of Groundspeed to Airspeed

In order to estimate the aircraft's airspeed during the final approach into EICK, an adjustment to the groundspeeds, as determined in **Sections 1.9.2** and **1.9.3**, was made. The adjustment used the wind component along the runway axis, and was based on the actual wind issued by the AMC two minutes before the accident. A conservative wind component of + 4 kts was used.

Using the above correction, the airspeed of the aircraft at various point on the approach was determined as follows; 74 kts as it flew level at 700 ft, 68 kts as it left 800 ft, 55 kts as it passed 400 ft in the descent, 42 kts as it crossed the runway threshold, and 26 kts just before the aircraft rolled to the right and impacted the runway.

1.10.6 Aircraft GPS Device

The aircraft was fitted with a GPS navigation device. This was recovered from the aircraft by the Investigation, and the stored data was downloaded. However, only data for previous flights were stored on the device. The Student Pilot informed the Investigation that, as he was on a flight where he was expected to navigate using charts and visual references, he had not switched on the device during the occurrence flight.

1.11 Survival Aspects

Although the aircraft sustained substantial damage, it came to rest in an upright orientation and the cockpit remained intact. The Student Pilot was wearing the four-point seat harness provided, and when the aircraft came to rest, he stated he was able to exit the aircraft normally and without injury.

The EICK AMC alerted the emergency services upon seeing the accident, and they responded immediately.

1.12 Organisational and Management Information

1.12.1 The Registered Training Facility (RTF)

The Student Pilot was undergoing flight training at an RTF based at EIWF. The RTF was first registered in 2011. The current Certificate of Registration for the RTF was issued by the IAA on 31 October 2017 and was in effect on the date of the accident. The Instructor and the Chief Flying Instructor (CFI) were both included on the Panel of Instructors listed on the RTF Certificate of Registration.

1.12.2 Review of Training Records

The Investigation reviewed the training file for the Student Pilot, held by the RTF. The file indicated that issues related to airspeed control by the Student Pilot, had been identified and addressed. Similarly, once the Student Pilot commenced flights to EINN and EICK, the file indicated that issues related to landing flare on wider runways had also been identified and addressed. Furthermore, on the day prior to the accident, an instructor flew with the Student Pilot on the route that was to be flown as a solo navigation exercise the next day. This instructor was satisfied with the Student Pilot's progress, and noted that the "*landing Cork* [was] *satisfactory*". The training file did not indicate any landings by the Student Pilot on RWY 16 at EICK.

1.12.3 Safety Actions Taken by the RTF

Following the accident, the RTF's CFI undertook a review of the Student Pilot's landing technique at various runways used by the RTF. The Investigation was informed that during the review, the Student Pilot demonstrated the correct landing technique on runways with similar dimensions to EIWF. However, during a landing at EICK RWY 16, the Student Pilot showed a tendency to flare high as the aircraft came over the threshold of the runway.

The RTF also informed the Investigation that following the accident it was decided to categorise all runways into which the RTF operates. The categorisation would give guidance to Instructors on how to conduct training and specifically aid each instructor when allowing students complete Solo Cross Country Flights. The runway category would range from A to C, A being the least limiting/challenging and C being the most limiting in terms of student experience and ability.

In addition, the CFI also undertook a review of the procedures under which student pilots were sent solo throughout their training progression. As a result of the review, the RTF introduced a Progress Review process. Under this process, a student's progress is reviewed by an instructor other than the one that has been training them up to this point.

1.13 Additional Information

1.13.1 Visual Landing

During the initial portion of a visual approach and landing a pilot will divide their visual scan between the cockpit instruments and the exterior visual environment. Whilst the aircraft pressure altimeter is used to provide altitude information during the initial stages of an approach, it is generally not accurate enough for judging the flare. Thus, as the aircraft gets closer to the runway, the pilot relies more on external cues from the visual environment of the runway to gauge the approach profile and when to flare the aircraft for landing. This is a skill acquired through repeated practice, often at the airport where the training aircraft is based. Through this process the pilot gets used to matching the external visual cues required to perform a successful landing. A number of factors may be involved in judging when to flare for landing such as runway paint markings, runway surface texture, runway slope and the general surface environment close to the touchdown area of the runway, including runway width. Landing on a runway, which is wider than that which the pilot is accustomed to, may produce the illusion of the aircraft being lower than it actually is. This may cause the pilot to flare well above the runway, and could result in a stall.

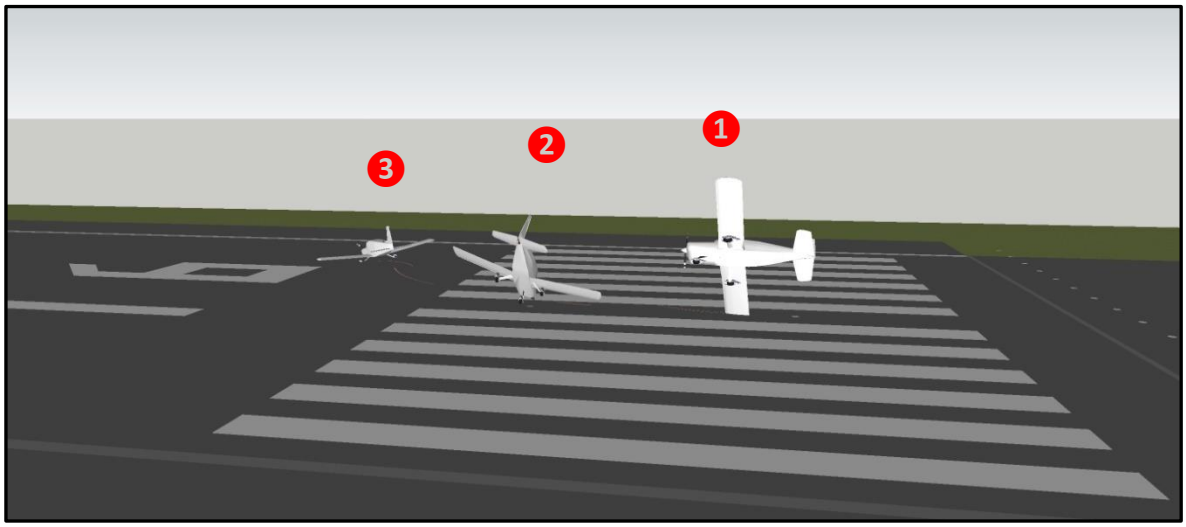
2. ANALYSIS

The flight proceeded normally until the latter stages of the approach to RWY 16 at EICK. At 2.3 NM from the runway, the aircraft climbed from 700 ft, to 800 ft above airport elevation. This coincided with the point at which the aircraft crossed the 3° glidepath, which would have been indicated to the Student Pilot via the PAPIs. The aircraft was travelling at an airspeed of approximately 74 kts as it flew through the 3° glidepath, and the climb may have occurred inadvertently in an attempt to reduce the airspeed for the approach, or as a result of extension of the first stage of flap. At 2 NM from the runway, the aircraft commenced a descent from a height of 800 ft, on a 4° glidepath. From this point, until the accident, the aircraft speed continued to decrease. From a witness statement, and video evidence, it appears that the aircraft approach profile was not stable. It is possible that the Student Pilot was concentrating on attempting to regain a 3° visual glidepath, but while doing so was not observing the decreasing airspeed.

At 400 ft above the airport elevation, and at a distance of 0.8 NM from the runway, the aircraft's airspeed was calculated to be approximately 55 kts. This is probably the point at which the Student Pilot selected landing flap, as this corresponds closely to the height and speed he was instructed to select the final stage of flap during an approach. At this point, the aircraft descent rate increased, and the rate of reduction in airspeed increased. The aircraft regained a 3° glidepath momentarily; however, the data indicates that the aircraft flew level again. This coincided with the steep rising terrain 0.5 NM to the north of RWY 16. It is possible that the Student Pilot reacted to the visual cue of the rising terrain by pitching the nose of the aircraft up slightly, thus bringing the aircraft above the 3° glidepath once more.

At 0.4 NM the aircraft is recorded as commencing further descent. Video evidence indicates that it descended below the 3° glidepath to a point just before the runway threshold, where the rate of descent was reduced. The aircraft crossed the threshold at approximately 15 ft.

This height was maintained, with an increasing nose-up attitude, until the aircraft stalled (**Graphic No.1**). The right wing dropped during the stall, impacting the runway (1). The nose of the aircraft then contacted the runway during which the aircraft righted itself (2). The nose gear and left main gear then detached and the aircraft came to rest to the right of the runway centreline (3).



Graphic No. 1: Computer generated image of accident sequence.

The majority of the Student Pilot's training on the subject aircraft type took place at EIWF. The paved area of EIWF's runway is significantly less, both in length and width, than RWY 16 at EICK, where the accident occurred. In addition, the approach paths to the runways at Waterford are over relatively level terrain. The Student Pilot had demonstrated to his instructors that he was able to carry out visual approaches, with appropriate flare height, to the runways at EIWF. The Student Pilot's logbook indicated that, other than EIWF, he had previously landed three times in EINN and three times in EICK, all in the subject aircraft type. Although flare and landing issues had been raised during landings on the wider runways at EINN and EICK, these had been addressed. The Student Pilot had demonstrated good landing technique at EINN and EICK to an instructor the day prior to the accident. The Student Pilot had not landed on RWY 16 at EICK before.

During the accident flight the Student Pilot had carried out a successful approach and landing on RWY 24 at EINN without incident. While this runway is 45 m wide with shoulders of 8 m either side, the approach was over level terrain.

Analysis of the radar data and CCTV data indicates that the Student Pilot appears to have had difficulty maintaining a stable approach path to the runway at EICK, which started with an approach from above the 3° glidepath. During an attempt to regain the glidepath from above, it is possible that the rising terrain just before the threshold of RWY 16 at EICK may have caused the Student Pilot to level off, further contributing to the unstable approach. The distraction of the rising terrain may have contributed to a lack of airspeed monitoring by the Student Pilot.

Although previous instances of lack of attention to airspeed had been addressed, inattention to airspeed was a contributing factor in this accident. The RTF informed the Investigation that it had changed its procedures to include a Progress Review a various stages of a student's training program. It is intended that this should identify if there are areas where a student pilot might require additional training prior to progressing to the next stage. Thus the Investigation does not make a Safety Recommendation in this regard.

Although a review of the Student Pilot's training records showed occasions when he had flared high during landing on wider runways than those at EIWF, the RTF informed the Investigation that this issue had been addressed, and the Student Pilot had demonstrated appropriate landing technique at EINN and EICK prior to the accident flight. On the day of the accident, during the navigation exercise, the Student Pilot had carried out a successful landing at EINN. However, the Student Pilot had not landed on RWY 16 at EICK before. The touchdown area of RWY 16 has additional paved areas associated with the Jet-blast area and taxiway fillet, which are located to the left of the runway centreline, i.e. on the Student Pilot's side of the aircraft. This would make the runway appear even wider, especially when viewed from the left seat of an aircraft. This likely contributed to the Student Pilot flaring the aircraft earlier than was appropriate during the landing on RWY 16 at EICK. This is confirmed by the video evidence, which shows the aircraft levelling at approximately 15 ft above RWY 16 at EICK.

The Investigation notes the safety actions taken by the RTF to address the issue of student pilots carrying out landings at airports other than EIWF, and thus does not make a Safety Recommendation in this regard.

3. CONCLUSIONS

3.1 Findings

1. The Student Pilot was carrying out a solo navigation exercise under the approval of an authorised Flight Instructor.

2. The Flight Instructor was in possession of a valid licence, Instructor Rating, and medical certificate.

3. The Student Pilot was in possession of a valid Class 1 Medical Certificate.

4. The aircraft was operating on a valid ARC.

5. The approach to RWY 16 at EICK was unstable and there was a continuous decrease in airspeed.

6. The Student Pilot may not have been sufficiently familiar with the visual environment on the approach including, the sloping terrain shortly before RWY 16, and the wider threshold area at the beginning of the runway.

7. The aircraft flew over the threshold of the runway at approximately 15 ft, in level flight, with an increasing nose-up pitch, and a reducing airspeed.

8. The aircraft stalled as it crossed the threshold of the runway.

9. During the stall, the right wing dropped and contacted the runway surface.

3.2 Probable Cause

1. The aircraft stalled in level flight, approximately 15 ft above the runway surface, resulting in a loss of control.

3.3 Contributory Cause(s)

1. Unfamiliarity with the visual environment of the approach and threshold of RWY 16 at EICK

2. Unstable approach to RWY 16 at EICK.

3. Inattention to airspeed during the approach and landing phases.

4. Safety Recommendations

In light of the Safety Actions taken by the RTF, this Report does not sustain any Safety Recommendations.

- END -

In accordance with Annex 13 to the Convention on International Civil Aviation, Regulation (EU) No. 996/2010, and Statutory Instrument No. 460 of 2009, Air Navigation (Notification and Investigation of Accidents, Serious Incidents and Incidents) Regulation, 2009, the sole purpose of this investigation is to prevent aviation accidents and serious incidents. It is not the purpose of any such investigation and the associated investigation report to apportion blame or liability.

A safety recommendation shall in no case create a presumption of blame or liability for an occurrence.

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